

R E M A R K S

This is in response to the Office Action that was mailed on December 1, 2004. Claims 1-3 are amended without change in scope to address a formal issue raised by the Examiner. No new matter is introduced by this Amendment. Claims 1-11 are pending in the application.

Objection was raised to claims 1-11, on the ground that claims 1-3 contained the language "characterized in that". The language in question has been changed to "wherein", as kindly suggested by the Examiner.

Claims 1-11 were rejected under 35 U.S.C. §102(b) as being anticipated by JP 8-283425 (Haraguchi '425). The rejection is respectfully traversed.

Haraguchi '425 describes a polymer material with compositional gradient in which metal oxide particles are dispersed in an organic polymer. The component-gradient polymer material is prepared by a process comprising: applying a homogeneous solution of a heat-curable resin composition and silicone alkoxide onto a substrate; hydrolyzing and polycondensing the silicone alkoxide under specific conditions, and curing the heat-curable resin. However, the metal

oxide particles and the organic polymer are not covalently bonded in the polymer material in Haraguchi '425.

In contrast to Haraguchi '425, the polymer material with compositional gradient disclosed and claimed in the present application is "composed of an organic polymer component and a metal oxide component which are covalently bonded to each other". If the covalent bond were not present therebetween (as in Haraguchi '425), the interfacial strength between organic polymer and metal oxide would be deteriorated. In the present invention, however, they are covalently bonded, and no deterioration of interfacial strength occurs.

Haraguchi '425 neither teaches (§102) nor suggests (§103) the present invention.

Claims 1-11 were rejected under 35 U.S.C. §102(b) as being anticipated by JP 9-87526 (Haraguchi '526). The rejection is respectfully traversed.

Haraguchi '526 discloses impregnating a polymer with a metal alkoxide (forming a metal oxide) to form a gradient coating. As is stated in the English-language abstract of Haraguchi '526, the solid organic polymer (e.g., polyamide) is immersed in a metal alkoxide (e.g., tetramethoxysilane) or a solution thereof, but the impregnation operation is stopped before the polymer is uniformly impregnated with the alkoxide, thus forming a structure of a

gradient metal alkoxide concentration in the polymer matrix. No covalent bond between the organic polymer and the metal alkoxide is formed in Haraguchi '526.

In contrast, the polymer material with compositional gradient disclosed and claimed in the present application is "composed of an organic polymer component and a metal oxide component which are covalently bonded to each other". As explained in the specification, from line 19 on page 16 through line 8 on page 17 and in the Preparation Examples, the organic polymer component is reacted with metal oxide component. For instance, Preparation Example 1 shows that polycarbonate diol is mixed with isocyanatopropyltriethoxysilane, such that the hydroxyl groups of the diol react with the isocyanato groups of the silane to form covalent bonds. This produces a polycarbonate having triethoxysilyl groups at both ends of the polycarbonate chain. The triethoxysilyl groups provide covalently bound polycarbonate-metal oxide hybrid materials.

If the covalent bond were not present therebetween (as in Haraguchi '526), the interfacial strength between organic polymer and metal oxide would be deteriorated. In the present invention, however, they are covalently bonded, and no deterioration of interfacial strength occurs. Haraguchi '526 neither teaches (§102) nor suggests (§103) the present invention.


Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$120.00 is attached hereto.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Rick Gallagher (Reg. No. 28,781) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment(s) :